

## The effects of physical activity (treadmill and vibration stimulation training) on Caspase-3 and Lubricin expression in articular cartilage in rats with glucocorticoid-induced osteoarthritis

Giuseppe Musumeci<sup>1</sup>, Carla Loreto<sup>1</sup>, Salvatore Giunta<sup>1</sup>, Rosanna Avola<sup>1</sup>, Karin Pichler<sup>2</sup>, Annelie Martina Weinberg<sup>2</sup>, Paola Castrogiovanni<sup>1</sup>, Maria Luisa Carnazza<sup>1</sup> and Sergio Castorina<sup>1</sup>

<sup>1</sup> Department of Bio-Medical Sciences, Human Anatomy and Histology section, University of Catania, Italy

<sup>2</sup> Department of Orthopaedic Surgery, Medical University of Graz, Austria

Glucocorticoids are considered the most powerful anti-inflammatory and immunomodulating drugs. However a number of side effects is well documented in different diseases, also in the articular cartilage where increase or decrease the synthesis of extracellular matrix components hormone dependent. The objective of this study has been to test the effects of procedures or drugs affecting bone metabolism on articular cartilage in rats with prednisolone-induced osteoarthritis and to evaluate the outcomes of physical activity on the articular cartilage by treadmill and vibration platform training. The animals were divided into 5 groups, bone and cartilage evaluations used whole-body scans, and histomorphometric analysis. Lubricin and caspase-3 expression were evaluated by immunohistochemistry, western blot analysis and biochemical analysis. These results confirm the beneficial effect of physical activity on the articular cartilage. The effects of drug therapy with glucocorticoids decrease the expression of lubricin and increase the expression of caspase-3 in the rats, while after physical activity the values return normal equipped to control group. Our findings suggest that it might be possible that the mechanical stimulation in the articular cartilage could release lubricin antibody that are capable of inhibiting caspase-3 activity preventing chondrocytes death. We can assume that the physiological balance between lubricin and caspase-3 could maintain the integrity of cartilage. So in certain diseases such as osteoporosis, mechanical stimulation could be a possible therapeutic treatment. With our results we can venture the hypothesis that a mild physical activity could also be used as a therapeutic treatment for cartilage disease such as osteoarthritis.

### References

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### Key words

Articular cartilage, osteoarthritis, glucocorticoids, lubricin, caspase 3, physical activity.